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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/699,846

11/04/2003

Motoki Kakui

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Washington, DC 20005-3096

EXAMINER

HUGHES, DEANDRA M

ART UNIT

PAPER NUMBER

3663

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/17/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/699,846

Applicant(s)

KAKUI, MOTOKI

Examiner

Deandra M. Hughes

Art Unit

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-9 and 11 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendment filed 11/21/06 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-9 and 11 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3-4, 6-8, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiGiovanni (US 6,504,973 filed 3/16/02) in view of Akasaka (US 6,292,288 published 9/18/01).

With regard to claims 1 and 11, DiGiovanni discloses a Raman amplification pump module (fig. 1) for outputting pump light for Raman-amplification of signal light propagating through an optical waveguide path, said module comprising:

- a light source system for emitting light having two or more different output peak wavelengths (#116);
- a nonlinear medium having an input port and an output port (#114; col. 6, lines 10-15);

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- said light source system comprises two or more light sources for emitting light having different wavelengths (col. 5, lines 30-35);
- said nonlinear medium affording nonlinear effect on light (#114 is a HNLF) emitted from said light source system and input from the input port, and outputting the resultant light as pump light from the output port (counter-pumps #116 are reflected to co-propagate to the output via #130).

DiGiovanni discloses a coupler #118 to couple the counter-propagating pump signal. However, DiGiovanni does not specifically disclose that the coupler is a WDM coupler. WDM couplers are well-known in the art. Further, Akasaka teaches a WDM coupler (fig. 1; #113) which multiplexes multiple pumps of different wavelengths in a counter-propagating configuration for a Raman amplifier. It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made for the advantage of counter-propagating the pump signal, as is specifically taught by Akasaka (fig. 1).

With regard to claim 3, DiGiovanni does not disclose a temperature adjusting means for the light sources.

With regard to claim 4, #130 oscillates and tunes pump signals to different wavelengths.

With regard to claim 6, the wavelength spacing is more than 2nm (fig. 8, #1 to #4).

With regard to claim 7, the Examiner considers the language directed toward the discretionary selection of the output wavelengths to be functional language. See below.

With regard to claim 8, HNLF is a Highly Nonlinear Fiber.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over DiGiovanni in view of Akasaka as applied to claim 1 above, and further in view of Bolshtyansky (US 6,456,426 published Sep. 24, 2002).

With regard to claim 2, DiGiovanni in view of Akasaka does not disclose a high-output power laser. However, Bolshtyansky teaches a Raman amplifier with a high-output power laser pump (col. 6, lines 60-65). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use a high-output power laser for the advantage of increased amplification.

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure *rather than function alone*. Since the structural limitations have been met by the prior art, the Examiner has reason to believe that the function limitation, i.e., the structure *as claimed* is capable of causing optical parametric effect. See MPEP 2114.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over DiGiovanni in view of Akasaka as applied to claim 1 above, in view of Tsuzaki (Broadband Discrete Fiber Raman Amplifier with High Differential Gain Operating Over 1.65 μ m-band, 2000).

DiGiovanni in view of Akasaka does not specifically disclose the claimed figure of merit (FOM). However, Tsuzaki teaches that a Raman amplifier with a highly-nonlinear-fiber (HNLF) with a FOM 13.2 W⁻¹dB⁻¹ (pg. MA3-2, line 16). It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was

made to apply the HNLF of Tsuzaki to the device of DiGiovanni in view of Akasaka for the advantage of a high-gain, low-noise Raman amplifier, as is specifically taught by Tsuzaki.

Claim Rejections - 35 USC § 112

7. Claim 9 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In particular, Applicant claims γ/α is not less than $13 \text{ W}^{-1}\text{dB}^{-1}$. However, γ/α is not less than $14 \text{ W}^{-1}\text{dB}^{-1}$ has not been enabled. Applicant clearly has not enabled all figures greater than $13 \text{ W}^{-1}\text{dB}^{-1}$. To overcome this rejection, applicant must claim the upper-limit of this range.

As is evident in Chen Ho et al. (*200-nm Bandwidth Fiber Optical Amplifier Combining Parametric and Raman Gain*; cited in the Form 892 mailed 8/23/06), one of ordinary skill in the art must resort to undue experimentation to determine the claimed relationship. Fig. 1 on pg. 978 is a set up to measure the Raman gain in a Highly Nonlinear fiber.

8. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, the claim is indefinite because the claimed range lacks an upper-limit. See section 7 above.

Allowable Subject Matter

9. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deandra M. Hughes whose telephone number is 571-272-6982. The examiner can normally be reached on M-F, 8:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Deandra M. Hughes
Primary Examiner
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